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Obituary Notice of
SIR JOHN FREDERICK WILLIAM HERSCHEL, BART.,

BY MR. HENRY W. FIELD, OF LONDON.

Read before the American Philosophical Society, December 1, 1871.

It is the painful duty of our Society to record the loss we have sustained in our membership, and indeed we may well say, the loss to the world in general, by the decease of the illustrious Sir John F. W. Herschel, Bart.

His father, Sir William Herschel, came from Hanover to England, in 1759, as one of the Hanoverian Guards' Band; and was for some time the subject of disappointment and privation. He however became instructor to a regimental band, stationed in the North, and fortunately obtained an organist's appointment in Yorkshire, and subsequently at Bath. Here it was that his taste for astronomy became developed, and from whence his first papers, "Observations of the Periodical Star Mira Ceti" issued. They were read before the Royal Society, in London, on the 10th May, 1780.

In 1781, the results of his studies and speculations led to his great discovery of Uranus (specially interesting from its leading to the discovery of the remote planet Neptune) which placed him most prominent in Scientific rank, which standing he retained until his death in 1822, being then in his 84th year.

Mr. Herschel, our lamented member, (unlike his father who raised himself from the humble rank of a regimental musician) after being educated privately by a Mr. Rogers, at an early age entered St. John's College, Cambridge, where by his great success and taste for science he graduated B. A. in 1813. He came out in the Mathematical Tripos, Senior Wrangler; an honor which was further enhanced by his attainment of the Fir s Smith's Prize. That his year was what is called, in Cambridge, "a good year," is evident from the names of the distinguished men of whom he took precedence, such as the following:—Peacock, Dean of Ely; Fallows, late Astronomer Royal at the Cape; Romilly, late Registrar of the University; Amos, Mill, and other men of note, whose names adorn the Det partments of Science, Theology and Literature. It may be worth while to note the feeling which subsisted among his fellow collegians; Charles Babbage, the mathematician (lately deceased) who coveted the honor of of Senior Wranglership, but knowing the powers of his antagonist, Herschel, declined to appear in the Mathematical Tripos, choosing rather to be at the Head of the Poll.

On the 27 May, 1813, he was elected Fellow of the Royal Society, and became one of its most active members, receiving in 1821 the Copley medal.

At his father's death he pursued that branch of science called "Observing Astronomy," and about this time he conceived the desirability of forming a Special Society, and was most active in its foundation, the present "Royal Astronomical Society."

In 1831, King William, as a tribute to his great scientific services conferred on him the honor of knighthood.

Sir John Herschel's researches on the positions of Nebulæ and clusters of stars, took up many years of his life. Several of the results he published in conjunction with Mr. (after Sir James) South, for which a reward of a gold medal was presented to both Astronomers. Were it not for the sincere love of science, the toil of these proceedings from midnight to sunrise would not have taken place; for no one can tell the strain on the constitution, the severity of which is gleaned from his observations while discussing the double stars. He remarked :

"Should I be fortunate enough to bring this work to a conclusion, I shall then joyfully yield up a subject on which I have bestowed a large portion of my time, and expended much of my health and strength, to others who will, hereafter, by the aid of those masterpieces of workmanship, which modern art places at their disposal, pursue with comparative ease and convenience an inquiry which has presented to myself difficulties such as at one period had almost compelled me to abandon it, in despair."

In 1833, Sir John Herschel was awarded the Royal Medal of the Royal Society, for his paper "On the Investigation of the Orbits of Revolving Double Stars." The Duke of Sussex, President, gave the following graphic account of his labors :

"Sir John Herschel has devoted himself, as you well know, for many years at least, as much from filial piety as from inclination, to the examination of those remote regions of the universe into which his illustrious father first penetrated, and which he has transmitted to his son as a hereditary possession, with which the name of Herschel must be associated for all ages. He has subjected the whole sphere of the heavens within his observation, to a repeated and systematic scrutiny. He has determined the position and described the character of the most remarkable of the Nebulæ. He has observed and registered many thousand distances and angles of position of double stars, and has shown, from the comparison of his own with other observations, that many of them form systems, whose variations of position are subject to invariable laws. He has succeeded by a happy combination of graphical construction with numerical calculations, in determining the relative elements of the orbits which some of them describe round each other, and in forming tables of their motions ; and he has thus demonstrated that the laws of gravitation, which are exhibited as it were, in miniature in our own planetary system, prevail also in the most distant regions of space ; a memorable conclusion justly entitled by the generality of its character to be considered as forming an epoch in the history of Astronomy, and presenting one of the most magnificent examples of the simplicity and universality of those fundamental laws of nature, by which their great Author has shown that he is the same to-day and for ever, here and everywhere.

"That he was not a mere meditative Philosopher, but one of laborious research and of a practical turn, appears from the imposing catalogue of his written works, a few of which I may be pardoned for enumerating: 13

papers on Optics; 28 on Astronomy; 10, Pure Mathematics, on Geology; on Photography; on Chemistry; on Natural Philosophy.

"The Encyclopedia Britannica boasts of excellent articles on Light and Sound, and Meteorology, now published separately."

A Manual of Scientific Enquiry, published by the Admiralty.

The Philosophical Transactions contain many of his valuable researches, especially those read before the Royal Society, 19 Nov., 1863, which will ever show his energy and perseverance in spite of the infirmities of his advancing age. In fact, turn where you may, light, emanating from Sir John, seems to cast its beams on almost every department of Science.

It may not be out of place to give an extract from his work "Outlines of Astronomy," a book which fills the student's mind with enraptured interest in the marvels which he reveals in plain and perspicuous language; for example:

"There is no Science which, more than Astronomy, draws more largely on that intellectual liberality which is ready to adopt whatever is demonstrated, or concede whatever is rendered highly probable, however new and uncommon the points of view may be, in which objects the most familiar may thereby become placed. Almost all the conclusions stand in open and striking contradiction with those of superficial and vulgar observation, and with what appears to every one until he has understood and weighed the proofs to the contrary, the most positive evidence of his senses. Thus, the earth on which he stands, and which has served for ages as the unshaken foundation of the firmest structures, either of art or nature, is divested by the Astronomer, of its attribute of fixity; and conceived by him as turning swiftly on its centre, and at the same time moving onwards through space with great rapidity. The sun and the moon, which appear, to untaught eyes, round bodies of no very considerable size, become enlarged on his imagination into vast globes: the one approaching in magnitude to the earth itself; the other immensely surpassing it. The planets which appear only as stars, somewhat brighter than the rest, are to him spacious, elaborate and habitable worlds; several of them much greater and far more curiously furnished than the earth he inhabits, as there are also others less so; and the stars themselves, properly so-called, which to ordinary apprehension present only lucid sparks or brilliant atoms, are to him suns of various and transcendent glory, effulgent centres of life and light to myriads of unseen worlds. So that, when after dilating his thoughts to comprehend the grandeur of those ideas his calculations have called up, and exhausting his imagination and the powers of his language to devise similes and metaphors illustrative of the immensity of the scale on which his universe is constructed, he shrinks back to his native sphere; he finds it, in comparison, a mere point; so lost, even in the minute system to which it belongs, as to be invisible and unsuspected from some of its principal and remote members."

Without fatiguing the Society, I think the following paragraph on the study of Natural Philosophy, will be its own apology for insertion.

"Among the most remarkable of the celestial objects, are the revolving double stars, or stars which to the naked eye or to the inferior telescope appear single, but if examined with high magnifying powers are found to consist of two individuals placed almost close together, and which when carefully watched are (many of them) found to revolve in regular elliptic orbits about each other; and, so far as we have as yet been able to ascertain, to obey the same laws which regulate the planetary movements. There is nothing calculated to give a greater idea of the scale on which the siderial heavens are constructed than these beautiful systems. When we see such magnificent bodies united in pairs, undoubtedly by the same bond of mutual gravitation which holds together our own system, and sweeping over their enormous orbits in periods comprehending many centuries, we admit at once that they must be accomplishing ends in creation which will remain for ever unknown to man; and that we have here attained a point in Science where the human intellect is compelled to acknowledge its weakness, and to feel that no conception the wildest imagination can form, will bear the least comparison with the intrinsic greatness of the subject."

England was not the only spot from which he made his observations. He found it desirable to carry on his investigations at the Cape of Good Hope, and for this far off scene of inquiry he embarked with his family at Portsmouth, 13 Nov., 1833. The course he prescribed to himself seems to have been to restrict his labors almost, if not entirely, to Stellar Astronomy. Still he did not omit to make many careful observations of the Nebulæ of Orion, of the Milky Way and of other heavenly phenomena; making accurate drawings, which he subsequently published.

In May, 1837, an extraordinary spot appeared on the sun's disc, the marvel of which was much increased when Sir John published his calculation that the crater of this supposed volcano was sufficiently large to allow the globe of the earth to pass in leaving all around a margin of 1000 miles.

On his return to England, in 1838, after, as he states, enjoying much happiness, together with the pleasures of good society, his grateful country bestowed upon him the dignity of a Baronetcy.

At this time, Photography beginning to attract much public attention, Sir John turned his thoughts to this beautiful art, directing his inquiries chiefly to that point so important to Photographers, the chemical action of solar rays.

Of the value attached to Sir John's scientific attainments we have abundant evidence in the instances in which he was called upon to occupy the place of advisor and councilor. As member of the Board of Visitors of the "Royal Observatory," when he was appointed to receive the annual report of its working and efficiency, a member of the "Standard Commission" on the question of the introduction of the "Metric System of Weights and Measures;" for many years as one of the leading members of the Council of the Royal Society.

On the retirement of Davies Gilbert, this venerable Society of savans nearly succeeded in compromising its title, by almost electing the plebeian philosopher to the dignity of President, in preference to the Royal patron of science and literature, the Duke of Sussex. So keen was the contest that the subject of our memoir lost it only by 8 votes in a meetting of 240 members. He was President of the Astronomical Society three times. In 1845, he presided at the British Association for the Advancement of Science at Cambridge. Many learned European societies, beside those of his own country, rejoiced to inscribe his name on their rolls; but to none of them will our American Philosophical Society yield in its admiration, of this great citizen of the Republic of Literature and Science, as evinced by the bestowal upon him of their diploma of membership. In 1842, he was elected Lord Rector of Marischal College, Aberdeen.

The last of his public official positions, previously to his retirement into the quietude of a country life at Collingwood, in Kent, was that of Master of the Mint, to which he was appointed December 16, 1850, and which he retained until Professor Graham's appointment, April 27, 1855. In this office Sir John was a worthy successor of the great Sir Isaac Newton, who filled that office in the reign of William III.

In subsequent times, the Mastership acquired a political character and was conferred generally on members of the Cabinet, which continued until what is known familiarly amongst Mint employés, the Revolution of '51, by which the old system of charters, indentures and contracts for the meltings and coinages, being considered antiquated, it was desired by the higher powers to abolish. Naturally, this move caused much alarm and dissatisfaction; the distastefulness of which was, however, greatly modified by the gentle and considerate manner in which Sir John exercised the authority entrusted to him.

The labor and anxiety inseparable from a reconstruction of so important an establishment, much impaired the health of the subject of this memoir. Still his mental vigor did not succumb to bodily infirmity, as daily he was at his post about 11 o'clock, rarely leaving till 5 or 6 p. m., when he might be seen walking out with his portfolio under his arm, filled with papers to consider and revise, as an evening amusement.

Among the many alterations made by Sir John, he framed and calculated tables for standarding the various qualities of gold and silver, which superseded those said to have been Sir Isaac Newton's.

He sanctioned the abandonment of "Trial Plates" (designated by Sir John "Fiducial Pieces") which had been prepared from time to time and used for centuries, and presumed to be mathematically of the due proportions of the pure noble metal, but not really so. In lieu of this practice Sir John directed the Queen's Assay Master to use his best endeavors to obviate the evil, so that no officer of a foreign mint should be able to question the conventional purity of our British coin as being other than for gold 916.6, and for silver 925.

In giving effect to the Master's wishes, the Queen's Assay Master worked out the important correction by preparing and introducing chemically pure gold and silver, in place of the standard trial plates. The following extract from Sir John's correspondence may be appropriately introduced here.

"The almost mathematical coincidence of the result of the Pyx (about 30 millions) with the legal standard, is the best proof which can be adduced of the admirable system of working the assays."

As illustrative of the unfailing kindness of this great man towards friends, as well as towards those, who had had the happiness to serve under him, the writer may be pardoned for introducing some of his *last* utterances contained in a letter, penned only five weeks before his departure to those realms of Light and Truth, amidst the wonders of which, while in the flesh, he *loved* to live.

"I am suffering under an attack of Bronchitis, which has lasted me all the winter, so excessively severe that I can hardly hold the pen, which must excuse the brevity of this, and being now in my 80th year, I can hope for no relief. I shall retain, however, *to the last*, a pleasing recollection of aid and support I received from you during the period of my administration of the Mint, and I know you will believe me ever, my dear sir, yours, most truly,

To H. W. F. (Signed) J. F. W. HERSCHEL.

In his domestic circle, he could unbend to the capacity of the young, in whose amusements he joined with spirit, and considering his advanced years, with wonderful energy. It may be instanced that, only a few years back, the great astronomer condescended to enter cordially into the children's Christmas gambols, and played in the most animated manner the part of Sir George with the Dragon; habiting himself in a coat of mail, extemporized from various culinary articles. His impromptu dialogue with his son as "the Dragon," was said by the elders to be absurdly clever. "The Herschels do everything well" was a common way of speaking of the philosopher and his family ; so here the Dragon was so life-like, though made only of brown paper with a scarlet cloth tongue, and the knight looked so doughty, that the tableau nearly sent one of the children into convulsions.

Sir John F. W. Herschel, Bart., K. H., D. C. L., &c., was born at Slough, near Windsor, 7 March, 1792. He married, in 1829, Margaret Brodie, daughter to the Rev. Dr. Alexander Stewart, by whom he had a family of three sons and nine daughters. One is married to General, the Hon. Alexander Gordon, uncle of the present Lord Aberdeen, and now heir presumptive to that title. His youngest son is an officer in the Royal Bengal Engineers. He is succeeded in the title by his son Mr. William James Herschel, of the Bengal Civil Service, who was born in 1833 and married in 1864, Anne Emma Haldane Hardcastle, daughter of the late Mr. Alfred Hardcastle, of Hatcham, Surrey.

Sir John died at his seat, Collingwood, Hawkhurst, Kent, on Thursday, the 11th May, 1871, at 10 o'clock A. M., being in his 80th year. He was buried in Westminster Abbey, on Tuesday, the 19th May. His remains were followed by the Presidents and many members of the various learned societies of England, also by the chief men of science in London.

The well-known Dean Stanley officiated on the mournful occasion, and on the following Sunday delivered in the Abbey one of his beautiful characteristic sermons, which may be found *in extenso*, in the July number of "Good Words," p. 453 (a work to which he occasionally contributed some popular papers on the wonders of the Universe). The Dean took his text from the 14th and 15th verses of the 1st chapter of Genesis.

"And God said let there be lights in the firmament of the Heaven to divide the day from the night; and let them be for signs and for seasons and for days and years; and let them be for lights in the firmament of the heaven to give light upon the earth; and it was so."

Glancing at the private sentiments of Sir John, in these days, when there appears to be an increasing antagonism between science and revelation, it is refreshing to remember how frequently in his writings, and in conversation with some of his friends, strong indications are observable, that the lofty mind of him who was a master in the science of the starry heavens could penetrate into higher regions still, and forget the proud achievements of intellect and science, in the humility of the adoring Christian; a humility which also manifested itself towards man in countless acts of generous sympathy and consideration. Of him truly it may be said in the language of a poetical tribute to his memory, which has recently appeared in a periodical of the day ("Good Words").

"Science and learning led *his* mind, in reverent awe above;
To him the voices of the stars proclaim'd their Maker's love."

In the above sketch of the scientific, official and personal character of the departed, it will be sufficiently apparent that with numberless other associations of the learned and scientific, in the decease of Sir John Herschel, *our* Society has to deplore the loss of a member whose name adorned the catalogue.

Mr. Dubois offered the following paper upon a *quasi* Coin, of Copper, affirmed to have been found at a great depth, in Illinois.

The annual reports of the Treasurer and Publication Committee were read and referred.

Pending nominations 679 to 682, and new nomination 683 were read; and the meeting was adjourned.